METASYS®

FM-OAP121 Output Analog Pneumatic Function Module

The FM-OAP121, like the FM-OAP101/102, is a digital to pneumatic interface used to convert a digital control signal from a DCM into a proportional pneumatic output signal. This signal then typically controls a valve or damper actuator. The new single-slot design of the OAP121 reduces base frame space requirements, speeds installation, and simplifies calibration.

Figure 1: The FM-OAP121

Features and Benefits

❑ **Single-slot Width**	Maximizes use of output slots when limited number of NCU/NEU panel slots are available; "plug-in" capability speeds installation and ensures secure wiring connections, saving time and money
❑ **Simplified Calibration Process**	Speeds commissioning process, enables local verification of calibrated points
❑ **Auto/Manual Control**	Provides added control during installation, commissioning, or troubleshooting
❑ **User-Definable Output Range**	Enables user to tailor Auto mode output pressure range to application requirements
❑ **Closed Loop, Non-leak Port Operation**	Uses no air when setpoint is reached, minimizes hunting, filter optional, robust
❑ **Two-color LED**	Allows quick and easy identification of OAP status

Order No. 636-046-a

Application Overview

The OAP121 is a digital to pneumatic interface which provides proportional control of pneumatic end devices. It receives a digital DCM control signal and converts this signal into a proportional pressure output that is typically sent to a pneumatic valve or damper actuator.

The OAP121 can, in most applications, easily replace an existing OAP101/102 assembly with no adjustments to the software. This frees up one extra NCU\NEU slot which can in turn be used for other control functions.

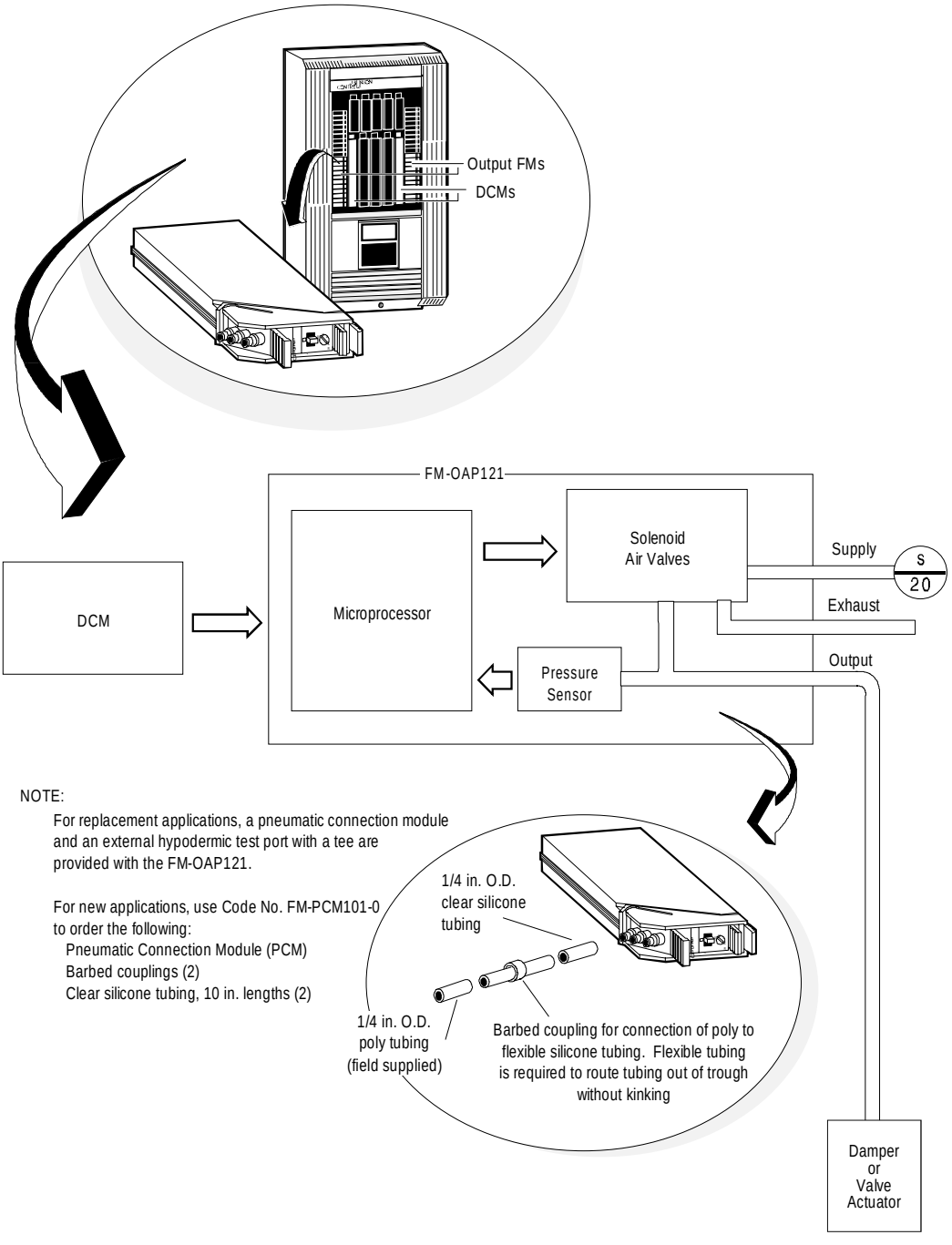

Figure 2: Typical Application of the OAP121 in an NCU/NEU Controller for Control of a Field Device

Operation Overview

The OAP121 has three modes of operation: Auto, Calibration, and Manual (which includes the ability to verify endpoints independent of calibration). Modes are selected using a dial on the front of the module.

When the OAP121 is in Auto mode, the DCM sends a digital control command to the OAP which is interpreted as a percentage. The OAP121 then calculates a corresponding pressure as a percentage of the user-defined pressure range (the range between the high ["H"] and low ["L"] endpoints), and sends this pressure to the field device.

In Manual mode, the OAP121 provides direct control of the field device through a ramped incremental pressure adjustment. This allows the user to easily adjust pressure to the field device anywhere in the range of 0.5 PSIG to 19.5 PSIG and in increments of 0.3 PSIG or smaller. A protected endpoint check (for the currently calibrated "H" and "L" values) is also provided.

Calibration mode is used to define the high and low endpoints of the output pressure range. The calibration process allows fast calibration (since it is performed independently of the Operator Workstation) and minimizes accidental recalibration of endpoints.

In all modes, the OAP monitors the pressure to the field device and automatically maintains the requested pressure. This provides for a closed-loop operation, ensuring that the field device remains at the correct pressure.

Upon power loss, the OAP121 closes the pressure supply port and opens the output port to exhaust, thus eliminating pressure to the field device and allowing it to return to the normal state.

The OAP121 is also equipped with a two-color LED which provides a quick means of identifying the operational status of the OAP. The LED colors and corresponding modes are as follows:

- Solid Green .....Auto
- Blinking Green .....Manual, Pre-calibration, Endpoint Check
- Blinking Red.....Active Calibration
- Solid Red .....Trouble Indication

Ordering Information

To order a FM-OAP121 from your local Johnson Controls branch, specify the complete product code number from Table 1 below.

An optional air filter is available and can be ordered using the product code numbers found in Table 2.

Table 1: Ordering Information

Product Code Number	Description
FM-OAP121-0	Includes: • Output Analog Pneumatic Function Module • Pneumatic Connection Module(FM-PCM101) • External Hypodermic Test Port with Tee
FM-PCM101-0	Includes • Pneumatic Connection Module • Barbed Couplings (2) • Clear Silicone Tubing—10 in. Lengths (2)

Table 2: Optional Accessories

Product Code Number	Description
A-4000-137	Air Filter

Specifications

Product	FM-OAP121-0
Output Range	0.5≤ to ≥19.5 PSIG (4≤ to ≥134 kPa) with ≥20 PSIG (138 kPa) supply pressure User-defined range in Auto mode
Output Flow	450 SCIMS (7375 SCCMS) at 20 PSI pressure drop
Output Volume	1 cubic in.(16 cubic cm.) minimum
Air Consumption	1 SCIM (16 SCCM) maximum
Input-Output Characteristics	Linear pressure output proportional to digital input
Supply Pressure	20 PSIG (138 kPa) nominal to 25 PSIG (172 kPa) maximum
Input Range	0% to 100% commands from DCM (Auto mode)
Resolution	Auto Mode: 0.1 PSIG (0.7 kPa) with 0.2 PSIG (1.4 kPa) deadband Manual Mode: <0.3 PSIG (2.1 kPa)
Accuracy	±0.3 PSIG (3 kPa) including non-linearity, hysteresis, and non-repeatability in Auto mode
Thermal Effects	±0.015 PSIG per °F maximum (±0.19 kPa per °C maximum)
Field Calibration	Low and High endpoints adjustable within pressure range Minimum span (High – Low): 2 PSIG (14 kPa)
Power Fail Condition	Output pressure goes to 0 PSIG (0 kPa)
Source Power	Power supplied on the backplane of the NCU/NEU
Operating Environmental Requirements	40° to 122°F (4.4° to 50°C) 5 to 95% relative humidity, non-condensing
Storage/Shipping Environmental Requirements	-20° to 140°F (-29° to 60°C) 5 to 95% non-condensing relative humidity
Dimensions (H × W × D)	0.85 in. x 2.6 in. x 7.0 in. (21.6 mm x 66 mm x 177.8 mm)
Shipping Weight	0.5 lbs (0.23 kg)
Agency Compliance	FCC Part 15 Subpart J - Class A, UL864, UL916, CSA C22.2 No. 205
Agency Listings	UL Listed and CSA Certified as part of Metasys®

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

JOHNSON CONTROLS

Controls Group
507 E. Michigan Street
P.O. Box 423
Milwaukee, WI 53201

FAN 636
Metasys Network Technical Manual
Printed in U.S.A.